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CHAPTER 8

PARTNERING WITH TEACHERS TO BRIDGE DIGITAL DIVIDES

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Bridging student digital divides is a longstanding goal of researchers, educators, and policymakers. Teaching plays a central role in student learning, so attending to teacher digital divides may also play an important role in bridging student digital divides. In this chapter, we present three cases of teachers who participated in professional development programs that partnered with the teachers. The programs were designed to improve student learning through technology. We detail the teachers' experiences and their own learning in the use of technology as an important lever for improving student learning. These three cases work to contextualize the complex nature of teacher learning in the use of instructional technologies. Across the three cases, we found the importance of meeting teachers where they are instructionally both in terms of technology and their subject area. Our findings also highlight the importance of attending to instructional approaches and pedagogy, not simply the use of technology in the classroom. Implications for teacher education and professional development are discussed.

Developing a digitally literate and technologically savvy populace are global priorities. School systems are charged with educating students in these digital literacies (Epstein, Nisbet, & Gillespie, 2011). Nonetheless, and despite increased availability of technology in schools throughout the world, a digital divide persists in schools (Incantalupo, Treagust & Koul, 2014; Warschauer, Cotten &

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Ames, 2011). This divide often runs along socioeconomic status, as well as racial and ethnic lines (Pearce & Rice, 2013). One reason these divides persist is that they are not simply a matter of availability of technology (Tate, Warschauer, & Abedi, 2016). Whereas the proliferation of internet connected devices beginning in the early 2000s has bridged technological access gaps, gaps in skills and usage persist (van Dijk, 2017). In school, the persistent gap in student skill and use of digital technology also suggests that digital divides are part of a larger systemic gap and should not be viewed in isolation (Irvine, 2010).

When examining digital literacy in schools, a long history of disconnects exist between availability of technology, its use, and student learning (Cuban, Kirpatrick, & Peck, 2001; OECD 2016). Despite an extensive base of research reflecting their continued struggles (Cuban, Kirkpatrick, & Peck, 2001; Warschauer et al. 2011), school, districts, and educational systems continue to take "technocentrist" (Papert, 1990, p. 4) approaches to integrating technology into the classroom with poor results (Cuban, 2013; Gamze Isci & Besir Demir, 2015). Such approaches place emphasis on the technology itself rather than on instruction and student learning. A technocentrist may ask,

> Will technology have this or that effect? Will using word processors make children more creative writers? Or will it lead to a loss of handwriting skills? Will the computer increase interpersonal skills? Or will it lead to isolation of children from one another? (Papert, 1990, p. 4)

In contrast, more productive approaches to technology integration have been holistic and include the technology itself, technical support, as well as professional development (PD) for teachers who will be using the technology (Warschauer et al., 2011). These approaches highlight the importance and role of teachers and teaching in improving student digital literacy and bridging digital divides.

Thus, in this chapter we examine the role of PD in supporting teacher learning and bridging teacher digital divides, because we assert that this is an important step to bridging student digital divides. We present the cases of three teachers and their engagement in technology-focused PD. In doing so, we describe productive ways in which researchers, professional developers, and practitioners can address teacher digital divides to bridge student digital divides.

INSTRUCTIONAL TECHNOLOGY AND TEACHER PROFESSIONAL DEVELOPMENT

Technology rich teaching environments are critical for improving student digital literacy and bridging digital divides (Ainely, Enger, & Searle, 2008). Technology rich environments encompass: (a) the availability of technology; (b) the nature and types of curricula being taught; and (c) the nature of instruction in the classroom including teacher interaction with students and student to student interaction (Ainely, Enger, & Searle, 2008). Though greater access to technology helps,

exceptional instruction and student learning can take place with limited technology (Ertmer, Ottenbreit-Leftwich, & York, 2007). As it relates to curriculum and instruction, student centered and constructivist approaches to instruction have shown positive student learning outcomes (Krishnan & Poleon, 2013; Rosen & Beck-Hill, 2012). In thinking about bridging teacher digital divides, we consider how teachers can design and develop technologically rich teaching environments. In the context of teacher learning, we also consider the limitations and constraints of PD. Specifically, PD programs typically cannot change the access to classroom technology but may be able to attend to those limitations in the design of teacher learning opportunities.

Professional development, in various forms, is a critical link to improving instructional quality and instruction with technology (Zinger, Tate, & Warschauer, 2017). Furthermore, PD that is responsive to teacher needs and centers on teachers has been shown to improve teacher knowledge of technology based instruction (Zinger, Naranjo, Gilbertson, Amador, & Warschauer, 2017). Indeed, comprehensive technological solutions that include involvement and support for teachers through PD have emerged as effective ways to address student digital divides by addressing teacher professional needs (Rosen & Beck-Hill, 2012, Warschauer et. al., 2011).

Productive ways to engage teachers in technology-based PD follow many of the same principles that generally guide effective PD. These include sustained engagement in the PD and a focus on effective instructional practices (Mouza, 2009; Rosen & Beck-Hill, 2012). An important technology-specific component is the need to address and support teachers' technological needs as well as their instructional and pedagogical needs (Polly & Orrill, 2012; Zinger et al., 2017). That is, PD should attend to both teachers' ability to use a technology-based resource tool, as well as how it can be used productively in instruction. Indeed, this is an ongoing challenge of PD programs, where teachers may know how to use a technology, but not how to use it to support student learning (Polly & Orrill, 2012). With this in mind, we present three case studies that highlight the importance of supporting teachers' understanding of how to teach with digital tools in order to bridge student digital divides.

CASE STUDIES

Given the complex nature of instructional technology and teacher education on its use, we present distinct cases of teachers learning how to teach with three, unique technologies: digital eBooks, a writing collaboration app, and a museum resources digital platform. These cases represent wide ranging instructional settings and teacher instructional contexts, as well as varying technologies and availability of technologies, as well as different PD approaches. All cases, however, represent instructional settings that are considered to be on the wrong side of the digital divide based on socioeconomic and demographic characteristics. These cases highlight both the possibilities and the limitations of supporting teachers as they learn how

TABLE 8.1. Case Study Teacher Demographics

Pseudonym	Teacher Demographics	Years Teaching	Teaching Setting	Student Demographics	Teaching Assignment	Available Technology	Experience With Tech	Digital Barrier and Divides
Anita	• Asian • Female	20	Large, urban, 7–8 school	28% English Learner 73% FRLP	English 8 Advanced English 8	Class set of Chromebooks, projector, document camera, teacher laptop	Piloted Chromebooks, 1 additional year, use of GAFE apps	Digital Literacies (i.e. Keyboard shortcuts: Ctrl + F)
Helen	• White • Female	5	Large, urban K–8 school	• 70% African American • 15% Multiracial • 14% White • 71% FRMP • 24% SPED	History Reading	6 Desktops, teacher ipad, projector and document camera	Extensive use of online resources such as YouTube	Availability of technology Connecting tech to learning goals
Frank	• White • Male	23	Small, rural, 6–12 school	• 93.2% White • 40% FRLP	English 8 Composition II (community college)	One-to-one iPad program, projector, teacher laptop	Piloted iPad program, 3 additional years, use of GAFE apps	Google Docs sharing functionality Interpreting program output

to use technology to meet student learning goals. Table 8.1 provides an overview of teacher demographics.

Case 1: Anita

Teacher Background and Teaching Context. Anita, a 20-year veteran English Language Arts teacher, and works at a large middle school in an urban school district in Southern California. She teaches 8th grade students, some of whom are English Learners (28%) and most of whom are economically disadvantaged (73%). For years, she has used the *Gradual Release of Responsibility Instructional Framework* (Fischer & Frey, 2013), providing focused and guided instruction using her projector or whiteboard and independent learning opportunities that rely heavily on paper-based methods. During the 2015–2016 school year, many of her practices changed.

Now, Anita teaches her 180 students each day in a newly renovated classroom that includes a class set of Chromebooks as a part of the district's grant-funded, one-to-one device program. Although she has vast knowledge of the instructional strategies that best serve her student population, Anita is new to the ways that digital tools can support learning in the information age. The district, too, is new to what productive teaching and learning with a one-to-one device program requires. Through some trial and error, the district realized that schools needed increased internet bandwidth, additional classroom internet points of access, tailored teacher support, and digital citizenship coaching for students.

Throughout the 2015–2106 year, Anita continued to collaborate with her colleagues and attend district-sponsored PD intended to support teachers' technical, pedagogical content knowledge. Because of her expert content and pedagogical knowledge, but still novice status as a technology user, the district's curricular team approached her with a unique opportunity to support a blossoming research-practitioner partnership (RPP).

PD and Teacher Learning Opportunities. Anita's district partnered with a local university to test the efficacy of a digital text formatting for improving students' reading comprehension. Visual Syntactic Text Formatting (VSTF) uses natural language processing to break sentences up at salient clause and phrase boundaries, fits each row of text into one or two eye fixations, and uses a cascading pattern to denote syntactic structure (Walker et al., 2007; Walker et al., 2005a). As one of this study's pilot teachers, Anita worked closely with the university's research team and the district's instructional team. In doing so, all members of this RPP hoped to learn about common stumbling blocks teachers new to the one-to-one Chromebook program were likely to face in general, and in using VSTF specifically. What the research team learned during the pilot year helped inform teacher PD opportunities intended to bridge the digital divide for 60 ELA teachers during the following larger implementation year.

Prior to using the class set of Chromebooks or the reformatted online materials in her own classroom, Anita attended two 6-hour professional development ses-

sions held at the district's administrative office. These sessions were facilitated by university personnel and one teacher-consultant from an out-of-state district, but they were developed so that the pilot teachers could dialogue with presenters at any time. During this PD, Anita explored the reformatted eBook materials aligned with the school's current textbook, learned about the results of prior studies (Thomas et al., 2012; Walker et al., 2005b, Warschauer et al., 2012; Warschauer et al., 2013), and talked at length with the presenters about the instructional strategies that worked best for the teacher-consultant's students—students unlike Anita's from 1,000 miles away. These in-depth conversations helped to support the burgeoning RPP between the university and the district.

As Anita began using the reformatted eBook materials during reading instruction in her own classroom, she worked in partnership with the second author and research partner during 12 classroom visits throughout the year. The research partner was a former high school ELA teacher and experienced user of instructional technologies. Through more than 45 hours of classroom visits, a professional working relationship was established between this veteran teacher and the researcher. Whether during informal lunch conversations or semi-structured interviews, Anita had ongoing opportunities to reflect on her teaching practices as well as ways to meet her students' academic needs in a technology-enhanced classroom. This teacher-researcher partnership, bidirectional in structure, was successful due to its collaborative, exploratory nature. Both professionals worked in tandem to identify the best practices and instructional pitfalls that might occur during next year's technology-based literacy intervention and both shared the common goal of improving student learning. The extended, one-to-one nature of this professional development as well as its grounding in a purpose larger than Anita's own classroom are likely attributors to its level of productivity.

Through these classroom interactions, the researcher came to know which digital literacy skills were needed for close reading of activities using digital texts. During one interview, Anita openly shared her concerns about her students' motivation as it related to using the eBook materials during a recent classroom activity. She stated, "I think the ones who struggle are mostly the ones who have low motivation…[they] don't want to page through the paragraphs of the text." Given that VSTF breaks down long spans of texts into just a few words per line, even short stories become lengthy. Here's an example of how this RPP worked to address this identified challenge.

A few months into using VSTF, Anita stated that her students did not want to "page through the paragraphs." The researcher inferred that her students may not be using a keyboard shortcut (i.e. Control F) for identifying words or phrases when locating textual evidence, a digital literacy practice (Peres et al., 2004). The researcher responded by saying, "I wonder if using Control F on the Chromebook to find words might be a motivator, and give our students a quicker way to find what they're looking for?" Anita nodded with, "maybe that's going to help."

During the researcher's next classroom visit one week later, Anita's 8th grade ELA students were observed using the Control F keyboard shortcut, a navigational efficiency indicator, to identify textual evidence.

Through productive discussions with the researcher, the teacher targeted a current concern in the classroom (i.e. student frustration and motivation to locate evidence in digital text) and the researcher suggested one digital literacy skill that might alleviate it. But it was Anita's willingness to take a risk by changing the way she taught close reading via eBooks that was the first step in improving student digital literacy skills. Ultimately, this partnership was successful because it was built on curiosity, trust, and a focus on Anita's evolving professional needs related to technology use, as well as the intermediate goal of supporting a technology-based literacy intervention, and the ultimate goal of meeting all students' reading and writing needs.

From Learning to Action. During the broad implementation intervention year that followed, Anita continued to work with members of the university's research team through six additional classroom visits by the researcher and by attending monthly, 90-minute PD sessions. The Control F keyboard shortcut was presented during one of these PDs as an effective skill for locating textual evidence in digital texts. Her exploration of the affordances of VSTF, and her comfort with it, grew from what she came to know the previous year. Because of this comfort, Anita shared another effective strategy when incorporating VSTF into ELA instruction during the third monthly PD. To support her colleagues' understanding of her effective oral fluency lesson, she presented an overview to a room full of teacher-participants, including images of her students engaging in partner reading. This oral fluency lesson paralleled the one discussed by the out-of-state consultant during the introductory PD nearly one year prior. She reported that VSTF allowed her own students to read with more fluency. She recommended that partner reading (i.e. student pairs take turns reading VSTF text aloud supporting each other's pronunciation) be used to meet the foundational Common Core State Standard for reading fluency (CCSSI, 2010)—a skill that many of the district's English Learners were still developing. Other teacher-participants took up this practice once they had an opportunity to see it being used by their own district's 8th grade students.

The ongoing, one-to-one professional relationship between Anita and the university researcher helped transition her from an emerging instructional technology user to one who is confident enough to share her own technology-enhanced instruction with ELA teachers from all the intermediate schools in her district.

Case 2: Helen

Teacher Background and Teaching Context. Helen is a white, female, 6th grade teacher who teaches history and reading. She has been teaching for five years in a large urban school in the eastern region of the United States. The school she teaches in represents an urban, high-need school in many respects. The major-

ity of students are African American and come from working class families, the school is considered low performing, and students need to pass through metal detectors to come to school each day. Helen's history class has a dozen students and all but one are African American. Student desks are set-up in a U-shape facing a table with a document camera and a projector in the middle of the room. Along the back of the room are six desktop computers with 17" monitors and there is a computer at the teacher's desk. Additionally, Helen uses a laptop and her personal iPad. In observing Helen, the research team found that she cares deeply about her students, often checking in on them and addressing issues related to their lives.

Helen uses technology regularly in her class, often showing videos from YouTube, or gathering instructional resources from places like History.com. Helen notes the constraints that only having six computers in her classroom pose. She lamented for this limitation with, "I wish I had access to more computers so that the students could complete [their history activity] by themselves or in small groups instead of a whole group." Helen also raises the frequent double pronged challenge of finding time to plan and design, and coherent ways of integrating new technology that meet learning goals for students.

When Helen initially engaged in the PD program, she noted that "I already expressed my concern with 'time'. I still have concerns with the tool itself, or, how it fits into 21st Century learning... where learning is more about what you do with information/artifacts/tools rather than accessing it." This highlighted two challenges relating to planning time and pedagogy that PD designers and coaches would need to address through the PD series to meet Helen's learning needs. Both PD sessions and the coaching programs were deliberately set-up to be highly flexible and changed to meet the needs of individual teachers in their own instructional contexts.

PD and Teacher Learning Opportunities. Helen and two of her school site colleagues agreed to participate in a year-long PD program that focused on integrating digital museum resources in instruction. The PD program focused on the use of an online platform developed by a large national museum. The platform provides teachers with access to digital resources and tools to build collections of resources including photos, historical artifacts, and videos, as well as instructional tools to integrate collections of resources into instruction. The PD program was deliberately designed to engage groups of teachers from the same school site to promote collegial collaboration, which has been identified as a key component of successful PD (Garet & Porter, 2001). Unfortunately, due to a number of issues including the difficulty of finding substitute teachers, only Helen participated in the PD series.

The PD series included four day-long, face-to-face sessions running from fall to spring of the school year, three hour-long online PD sessions, and a coach that visited Helen's classroom five times and provided her with support via email and phone. The purpose of the PD series was to both develop teacher technological competence in using the online platform, as well as develop teacher instructional

capacity to teach with the platform. PD time was provided for teachers to design activities and lessons. These efforts were further supported by instructional coaches that participated in the PD, and visited and supported individual participants in their own classrooms. As part of the program, teachers were asked to use the online platform for instruction, but there were no specific requirements of them. Some incorporated a single digital resource for activities and others used large, elaborate online collections of resources.

From the face-to-face PDs, Helen had opportunities to learn how the digital platform functioned, how the digital platform could be used instructionally, and how other teachers were using the platform. She also had the opportunity to plan and discuss her own use of the platform in her future instruction. During the first two PD meetings, significant time was dedicated to helping teachers learn how to navigate, search, and use various tools on the digital platform. As the PD sequence continued, more time was dedicated to demonstrating the type of instruction that could be designed and provided through use of the platform. Specifically, sessions were conducted to engage teachers in thinking and designing instruction that engaged students' historical thinking. Through all PD's, time for collaboration between teachers was provided in addition to the time designated for design.

Through coaching, Helen was provided with more targeted support. Her coach worked closely with her in designing and building collections of resources from digital platform and using them in instruction. Coaching support included the design of digital resource collections based on Helen's needs, co-creation of collections, sharing of instructional ideas, and feedback on implementation of the digital platform. As the school year went on, Helen's coach met with her to both plan and implement instruction, at times functioning as a teacher's aide, or second teacher in the classroom.

From Learning to Action. Helen first used the digital platform in January after attending two PDs and meeting with her coach. The platform was used over two days, where in the first day a video was used to introduce a topic to students and the second day an additional video and other materials were used. The materials were a combination of teacher-discovered resources including images and videos built on an existing collection of resources created by the coach. The use of video by Helen aligned with her previous use of digital resources in her instruction. She also used the collection in a primarily teacher centered way, projecting the materials to the entire class from her laptop. Part of the lesson included student discussion, but students did not get to engage directly with the digital platform or navigate it on their own. The collection and lesson revolved around their city and its history. Students were asked to write an essay about what it would have been like to live there in the past. Helen noted that the students enjoyed the lesson and activity, especially the aspects that connected to their own city.

The research team and her coach visited Helen in her classroom in February, the second time she used the digital platform and quickly became aware of the technological limitations in her classroom. Helen had set-up all her computers

to the digital resource platform website and expressed her concerns about internet access and issues that she had run into the prior day. Due to the limitation of computers in the classroom, Helen had kids work in pairs or in triads for the day's activity. For this lesson, the resource collection designed by Helen was more student-centered than the first lesson observed. In this lesson, students navigated the digital platform and answered questions about the different resources aggregated in the collection. Similar to what the research team observed, Helen noted, that students were highly engaged with the activity. Central to this engagement was student agency and that the task allowed them to connect the digital resources they worked with to their own lives.

Through these two lessons we see how Helen shifted to a more student-centered lesson as she transitioned from the first to second time she used the digital platform. We saw her adapt to limited technology access by having students work in groups. We also saw her expand the use of the platform to become more student-centered as she became more comfortable with it, and as she saw students engaged with the platform. Indeed, in the subsequent year, other teachers adapted Helen's collection and she continued to use it. From a PD perspective, we saw the roles that face-to-face and coaching played in helping Helen contextualize learning for her students as seen from the first lesson. PD also supported her understanding of how to use the digital platform as well as how to teach with it, bridging the teacher's divide of utility of the platform and alignment with her instructional goals. Coaching was critical in supporting Helen, with the coach working to troubleshoot any technical problems that arose, create initial collections that met Helen's instructional needs, as well as encouraging Helen to engage with the digital platform.

Case 3: Frank

Teacher Background and Teaching Context. Frank, an English language arts teacher with 23 years of experience, works in the larger of two buildings that make up a small, rural public school district in Western New York. In the past, he has taught secondary ELA courses including English 9, English 12, electives, and an academic intervention course for struggling readers and writers. He also teaches composition courses at night at a local community college. Currently, Frank teaches 8th graders, some of whom are socioeconomically disadvantaged (40%) and almost exclusively Caucasian (93.2%). Unlike large districts who employ curriculum specialists, Frank is responsible for designing his own curriculum and making all decisions about the instructional strategies he will use each day, for each of his six classes. This means that he is free to explore unique methods and tailor instruction to his small classes of no more than 25, heterogeneously-grouped students.

Much like Anita, Frank's extensive teaching experience provided him with the pedagogical content knowledge to meet his learning objectives in a paper-based classroom (Koehler & Mishra, 2009). When the district's Technology Coordinator approached Frank about serving as one of the pilot teachers for the one-to-one iPad adoption, he was hesitant but agreed to teach ELA using the class set provided to him. Despite the outfitting of one-to-one mobile devices in his classroom, Frank was given little more than a tutorial on how to operate an iPad.

Frank's minimal guidance on how to maximize the utility of iPads as an instructional tool reflects this district's culture of classroom exploration as teacher professional development. But Frank and his colleague worked closely during the pilot year and shared the best practices and drawbacks to using iPads to teach English language arts. When Frank's colleague (the second author) left teaching to pursue a doctoral degree, she and Frank agreed to continue their professional working relationship that primarily focused on the effective use of instructional technology for reading and writing instruction.

PD and Teacher Learning Opportunities. Through attendance at weekly presentations, webinars, and research conferences, the second author learned about the latest instructional technologies. She often shared this information with Frank, and they discussed how various tools and instructional strategies might support Frank's current instructional goals. One writing collaboration program (Wang et al, 2015), an innovative new technology, held great promise for supporting collaborative learning in his classroom and the pair set forth on a classroom study of the effects of this tool on student collaborative writing—the first study of its kind (Krishnan et al., 2018). Frank, like many veteran teachers, understood the benefits and limitations of paper-based collaborative learning activities in the classroom (Cohen & Lotan, 2014). Ideally, students learn from one another, gain greater perspectives, and have a broader audience for whom to write. At its worst, one student is saddled with the responsibility of the activity while others make superficial contributions, causing resentment and frustration on the part of the students as well as the teacher. Despite these concerns, one of Frank's instructional goals was to design reading and writing activities that invited students to learn from, and with, each other. When his colleague explained that the collaboration program uses Google Docs' revision history to show how much each contributor to the document added (Wang, 2016; Wang et al, 2015; Yim & Warschauer, 2017), he quickly understood its power in meeting his goal—to encourage his 8th grade students to write together. Yet, Frank was unsure about asking his students to write collaboratively in Google Docs and was uncertain about whether this type of innovative learning activity was developmentally appropriate.

Frank nonetheless agreed to partner with the researcher on the study to determine if and how the collaborative program supports students' synchronous writing in Google Docs. Knowing however, that he would have limited on-site support when using this instructional tool, he had reservations. Despite this, the pair developed two argumentative assignments to be used in the study—one to be written by his 8th graders in triads and one to be written independently. Above all, the project was intended to meet Frank's instructional goals, aligning with the Common Core State Standards for writing which asks students to write argu-

ments to support claims with clear reasons and relevant evidence (CCSSI, 2017). In an email sent to his research partner, Frank asked, "How do you interpret the program's data? How are we going to make sure that students only use in-class time to write in their Google Docs?" These questions helped his former colleague bridge the gap in Frank's understanding of the intervention tool and Google Docs' permissions. She created tutorial videos intended to support a greater understanding of these two important study elements. The study began once Frank and the researcher were comfortable with Frank's understanding of the tool and how to use it during instruction.

During the students' first day of writing, Frank asked them to use the collaborative program to see how they were contributing to their co-authored essays, taking time to highlight different collaboration patterns in different student groups and their implications for participation. After students left for the day, Frank contacted his research partner with an update. He shared the details of his unique and highly innovative classroom experience that only a former teacher could empathize with, and perhaps more importantly, help to troubleshoot. Through open dialogue, the pair negotiated ways to better support his students' online writing without contaminating their study's design. Frank also shared that he and his students were still unsure of how to interpret the primary data output for the program. Based on their initial use of the tool, the pair decided to make adjustments in the students' use of the tool by drawing their attention to a more easily interpretable numeric output table. In addition to troubleshooting solutions to classroom issues throughout this project, Frank shared his perceptions of the tool in supporting 8th graders' online, collaborative writing and how he thought it might be better suited to support the community college students he taught during his night classes.

Ultimately, this partnership and classroom study was relatively successful. Frank continued his professional development in the areas of data-driven writing instruction, classroom study design, and the use of instructional technologies for collaborative writing. Through this long-standing working relationship, the focus remained anchored in Frank's instructional goals. His willingness to share what he need further clarification on helped maintain the integrity of the study design and supported his instructional success.

From Learning to Action. Prior to the start of the following school year, Frank reached out to his research partner with his plans for using the collaboration program in the near future. He shared that he would be using it in his community college-level composition course, but did not report plans to use it with his 8th graders. He also shared his perception of 8th graders as being less suitable for group writing in general. This appears counter to the results of their classroom study, which found positive effects of group writing on students' subsequent, independent writing. Even after further dialogue about the positive study results, Frank's plans for using collaborative writing activities at the 8th grade level did not change, for this school year. However, Frank's use of this tool with his college students was later explained as his way of "getting it right." He shared that his

college-level learners were better equipped to deal with the interpersonal complexities of online collaborative writing and would be more apt to succeed while he further explored online writing pedagogies. Much like the other two cases, Frank's focus was on student success and his adoption and adaption of tools was highly contextualized.

CONCLUSION

Our goal in presenting these case studies is to provide insight into challenges as well as productive approaches to bridging teacher digital divides with the intent of bridging student digital divides. We present three considerations that professional developers and researchers may find useful in working with teachers to address this objective. First, all three of our cases reflect a partnership approach in which researchers and PD developers work together with teachers—an approach that contrasts with much of the PD teachers experience. Because these partnerships were able to focus on teacher needs, solutions were no longer a top-down effort to affect change within the classroom, a problem often observed in one-size-fits-all PD (Darling-Hammond, 2017). Second, in all three cases, the focus of PD and technology integration was on teacher classroom practice and student learning. Finally, in all of the cases, we highlight the importance of teachers seeing students succeed through technology use.

Partnerships

Across the cases we saw varying levels of partnership between teacher and educational researchers or PD support providers. Anita worked closely with her research partner to identify solutions for a purpose larger than her own teaching context, Helen sustained a yearlong partnership with an instructional coach who support her use of online museum resources for history instruction, and Frank continued his working relationship with a now former teacher, which resulted in an innovative research study on the affordances of collaborative writing. This partnership approach presented a number of advantages, including the ability to quickly identify and understand teacher problems of practice, a detailed understanding of the teaching contexts, and how technology might best fit in each context to promote student learning. Additionally, this partnership approach included various forms of teacher feedback that allowed for more targeted support and more meaningful teacher engagement in their own learning. Additionally, this approach provided researchers and support providers with opportunities to quickly address teacher needs as they arose. Using short iterative, responsive feedback cycles that scaffolded teachers' development as users of instructional technologies were central to the partnership's as well as teachers' instructional development.

Focus on Teacher Problems of Practice and Student Learning

Consistent with prior research, by surfacing teachers' classroom problems of practice, teachers and researchers were able to work together to find productive ways to integrate technology into instruction in a manner that was both comfortable to the teacher and worked to improve student learning (Penuel, Fishman, Cheng, & Sabelli, 2011). Anita's concern about her students' frustration with "paging through the paragraphs" lead to the use of a keyboard shortcut for locating textual evidence in digital text. Helen, who initially expressed concerns about the lack of available technology in her classroom, was able to engage in student-centered instruction through a collaborative strategy and lesson designed in partnership with her coach. Interestingly, despite the focus on student learning outcomes, Frank ultimately chose to use the technology with a student population he deemed more appropriate. This decision required a deep understanding of his students' digital literacy skills at each grade level.

Often PD approaches tend to focus on tools or specific instructional approaches rather than attending to the problems of practice that teachers need addressed. This may result in limited to no implementation of the technology and little impact on student learning. In our cases, as the PD and supports focused on how to use the technology to address individual classroom challenges, we observed successful engagement and tool implementation through these partnerships. We also note the widely differing instructional challenges faced by these teachers and how a one-size-fits-all approach would have failed to address their individual needs.

Seeing Students Learn and Succeed.

Through these cases, we observed the importance of teachers seeing student succeed while learning with technology. We saw two teachers, Anita and Helen, persist or expand their use of technology based on seeing themselves and their students succeed through their respective digital tools. Through seeing her students' success and reflecting on the successful practices of a teacher-consultant, Anita explored and share with her colleagues a novel method of supporting students' oral fluency skills. Helen, with focused support from an instructional coach and by seeing her students' engagement, continued to use the online museum resources in more collaborative ways. On the other hand, despite seeing student success with his 8th graders, Frank was more optimistic that his older, more digitally literate college students would be better suited for using the online tool. Thus, although Frank continued to use the digital tool after the study, he used it with a different population of students. Nonetheless, all teachers ultimately used technology to promote student engagement and learning in new ways. They were also able to overcome challenges and tensions partly because they saw student success. We note that we only present three cases here. Further research should include examining a larger number of teachers to better understand the relationships between teachers seeing their students succeed and their persistence in using technological resources.

IMPLICATIONS FOR GLOBAL LEADERS BRIDGING DIGITAL DIVIDES

In this chapter, we detailed cases of leaders in research, teacher PD, and classroom instruction working together to bridge teacher digital divides. We saw that bringing together teachers and researchers who have a shared vision for student success helped springboard and sustain PD initiatives intended to address teachers' individual needs when using an instructional technology. We also saw that researchers and professional developers actively sought to identify teacher instructional needs in the classroom. This allowed the developers to find ways to integrate technology that aligned more closely with teachers' goals and needs. When technology was integrated successfully, teachers were able to see students succeed in using the technological tool, which likely increased teachers' confidence and investment in the tool. In turn, these teachers went on to experiment with and use these technologies in novel or expended ways.

In the case of Anita and her partner we saw their global leadership in the exploration of classroom practices that capitalize on the student learning affordances of 21st Century instructional technologies. In the case of Helen, we saw a partnership and shared leadership with a team of researchers and professional developers to design learning targeted for her needs. Frank and his colleague represent global leaders using forward thinking classroom practices and research that addresses digital divides through peer-to-peer online collaboration.

Though we presented three cases, there are some important implications for those who lead in the work of supporting teacher learning to bridge their digital divides. When planning or approaching teacher learning opportunities, it is critical to find ways to present and promote the use of technology as a way of addressing classroom instructional challenges, rather than presenting tools as solutions or as decontextualized resources. Along those lines, it is also important to position teachers so they quickly see their own success and the success of their students. By doing so, teachers may be more likely to remain engaged through the initial instructional experiences with the digital tool—a critical time period. Finally, it is important to remain flexible as teacher expertise develops and their instructional needs evolve. Thereby, research partners will be able to meet teachers where they are in their developmental trajectories.

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CHAPTER 9

SOCIAL NETWORKING TECHNOLOGY AND THE SOCIAL JUSTICE IMPLICATIONS OF EQUITABLE OUTCOMES FOR FIRST-GENERATION COLLEGE STUDENTS

Yesenia Fernandez, Nancy Deng, and Meng Zhao

First-generation college student (FGCS) persistence and attainment has become key in ensuring social justice and equity on college campuses. However, a critical aspect of FGCS success, access to technology and social technology use as a tool, have not been central to the strategies implemented by post-secondary leaders to improve FGCS outcomes. Digital divide authors point out there is not only unequal access to technology but also differentiated use by socio-economic status when it comes to using it to access valuable information sources (DiMaggio et al, 2004; Hargittai, 2010). In addition, Martinez-Aleman, Rowan-Kenyon, and Savitz-Romer (2012), and Wohn et al (2013) discuss how social networking technologies can be tools to support FGCS persistence. Through this qualitative study informed by social capital and social network theory, we examine the type of social ties (family, friend, institutional) and institutional resources that social media use enables FGCS

Crossing the Bridge of the Digital Divide: A Walk with Global Leaders, pages 145–162.
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